



Micro Commercial Components



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## MCAC50N03Y

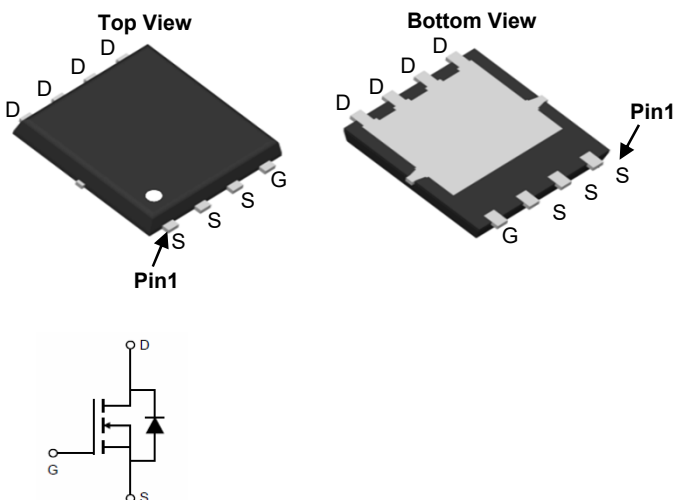
### Features

- Trench Power MV MOSFET technology
- Low  $R_{DS(ON)}$
- Halogen free available upon request by adding suffix "-HF"
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

### Maximum Ratings @ 25°C Unless Otherwise Specified

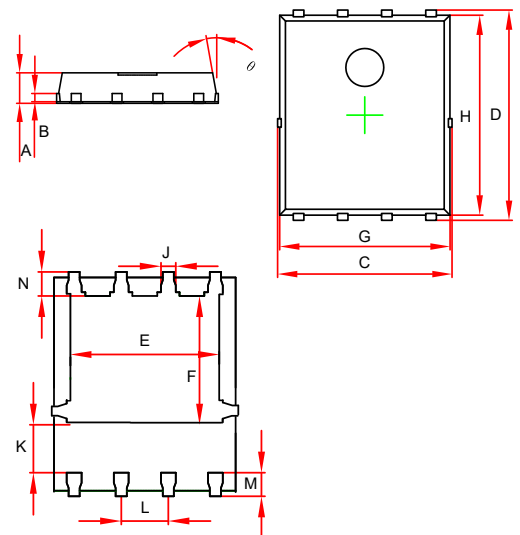
Symbol	Parameter	Rating	Unit
$V_{DS}$	Drain-source Voltage	30	V
$I_D$	Drain Current-Continuous (Note 7)	$T_C = 25^\circ\text{C}$ 50	A
		$T_C = 100^\circ\text{C}$ 35	
$I_{DM}$	Pulsed Drain Current (Note 3)	200	A
$V_{GS}$	Gate-source Voltage	$\pm 20$	V
$P_{DSM}$	Maximum Power Dissipation (Note 1)	$T_C = 25^\circ\text{C}$ 38	W
		$T_C = 100^\circ\text{C}$ 19	
$E_{AS}$	Single pulse avalanche energy (Note 3)	300	mj
$T_J$	Operating Junction Temperature	-55 to +175	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-55 to +175	$^\circ\text{C}$

### EQUIVALENT CIRCUIT



## N-Channel Power MOSFET

### DFN5060



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.035	.039	0.900	1.000	
B	0.010REF.		0.254REF.		
C	0.193	0.200	4.900	5.100	
D	0.232	0.240	5.900	6.100	
E	0.148	0.163	3.750	4.150	
F	0.130	0.142	3.300	3.600	
G	0.189	0.197	4.800	5.000	
H	0.222	0.230	5.650	5.850	
K	0.047	0.059	1.200	1.500	
J	0.014	0.018	0.350	0.450	
L	0.048	0.052	1.220	1.320	
M	0.020	0.028	0.510	0.710	
N	0.020	0.028	0.510	0.710	

**ELECTRICAL CHARACTERISTICS**( $T_a=25^{\circ}\text{C}$  unless otherwise specified)

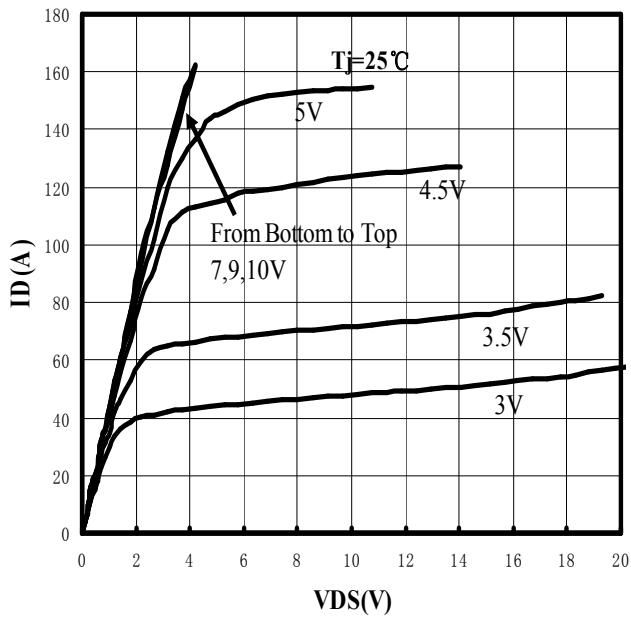
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1 5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1	1.3	2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=25\text{A}$ $V_{GS}=4.5\text{V}$ , $I_D=25\text{A}$		4.3 5.4	5.6 7.0	m $\Omega$
$g_{FS}$	Diode Forward Voltage	$V_{DS}=5\text{V}$ , $I_D=25\text{A}$	20			S
$V_{SD}$	Diode Forward Voltage	$I_S=50\text{A}$ , $V_{GS}=0\text{V}$		0.85	0.99	V
$I_S$	Maximum Body-Diode Continuous Current (note 7)				50	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$		2989		pF
$C_{oss}$	Output Capacitance			335		pF
$C_{rss}$	Reverse Transfer Capacitance			290		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		1.9		$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g$	Total Gate Charge	$V_{GS}=4.5\text{V}$ , $V_{DS}=25\text{V}$ , $I_D=14\text{A}$		26		nC
$Q_{gs}$	Gate Source Charge			3.5		nC
$Q_{gd}$	Gate Drain Charge			14		nC
$t_{D(on)}$	Turn-on Delay Time	$V_{GS}=4.5\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=2.5\Omega$ , $R_{GEN}=3\Omega$		21		ns
$t_r$	Turn-on Rise Time			32		ns
$t_{D(off)}$	Turn-off Delay Time			59		ns
$t_f$	Turn-off Fall Time			34		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=20\text{A}$ , $di/dt=100\text{A/us}$		14		ns
$Q_{rr}$	Body Diode Reverse Recovery charge	$I_F=20\text{A}$ , $di/dt=100\text{A/us}$		2.8		nC

**Note:**

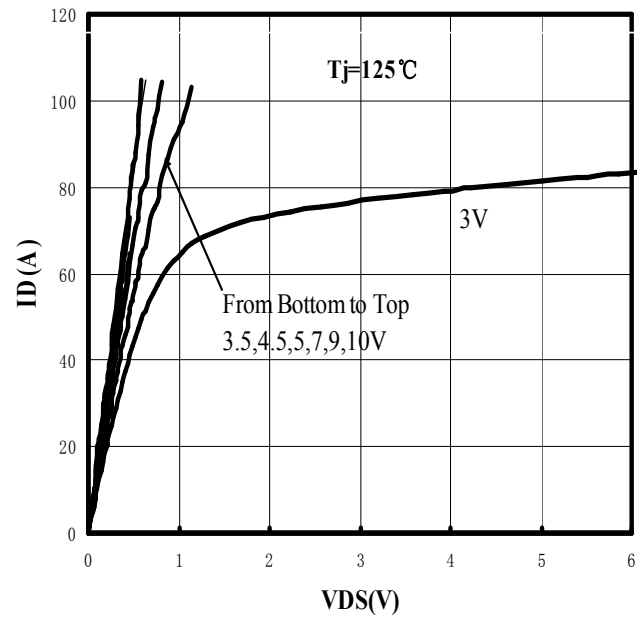
1. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in2 FR - 4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The Power dissipation PDSM is based on  $R_{\theta JA} t \leq 10\text{s}$  and the maximum allowed junction temperature of  $150^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.
2. The power dissipation PD is based on  $T_J(\text{MAX})=175^{\circ}\text{C}$ , using junction - to - case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. Single pulse width limited by junction temperature  $T_J(\text{MAX})=175^{\circ}\text{C}$ .
4. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to case  $R_{\theta JC}$  and case to ambient.
5. The static characteristics in Figures 1 to 6 are obtained using  $<300\text{ s}$  pulses, duty cycle 0.5% max.
6. These curves are based on the junction - to - case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of  $T_J(\text{MAX})=175^{\circ}\text{C}$ . The SOA curve provides a single pulse rating.
7. The maximum current rating is package limited.

## Typical Electrical and Thermal Characteristics

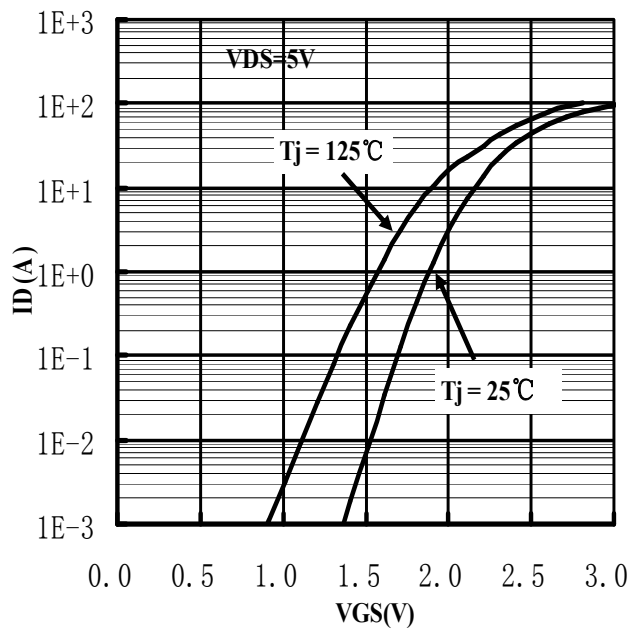
**Figure 1. Typ. Output Characteristics**



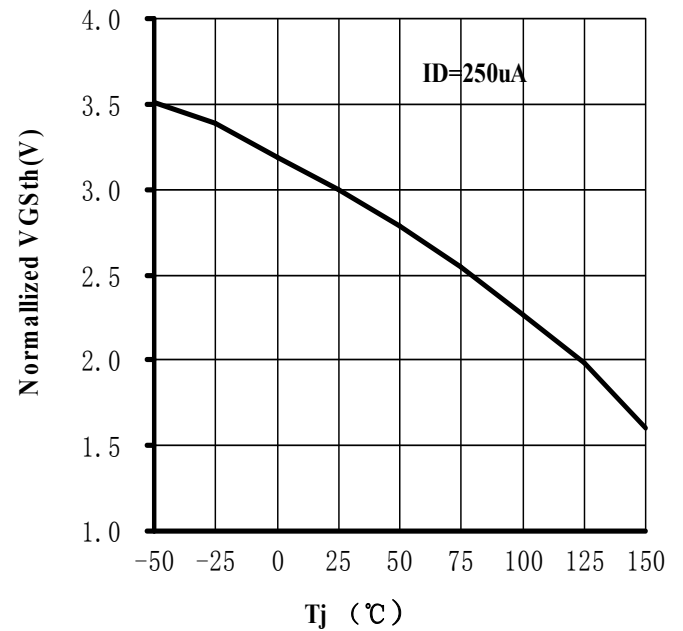
**Figure 2. Typ. Output Characteristics**



**Figure 3. Transfer Characteristics**

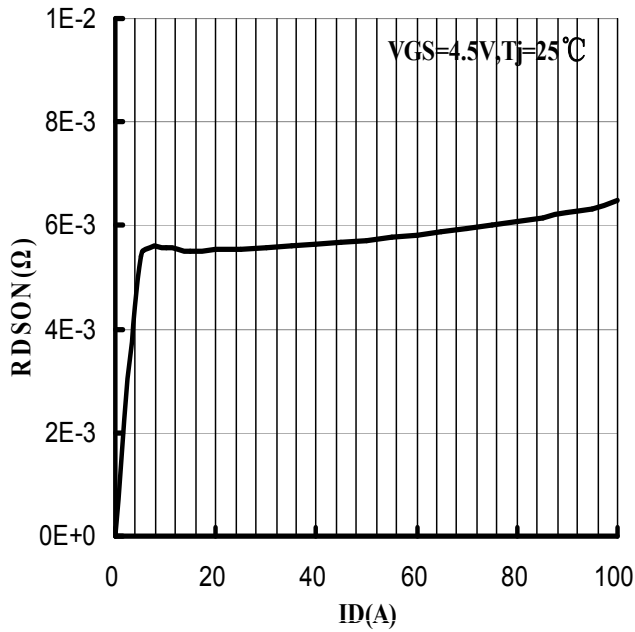


**Figure 4. Gate Threshold Voltage Characteristics**

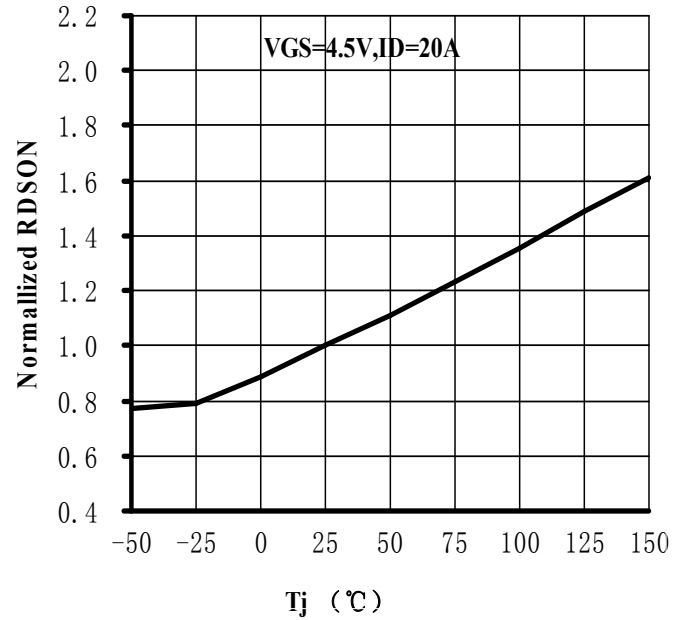


## Typical Electrical and Thermal Characteristics

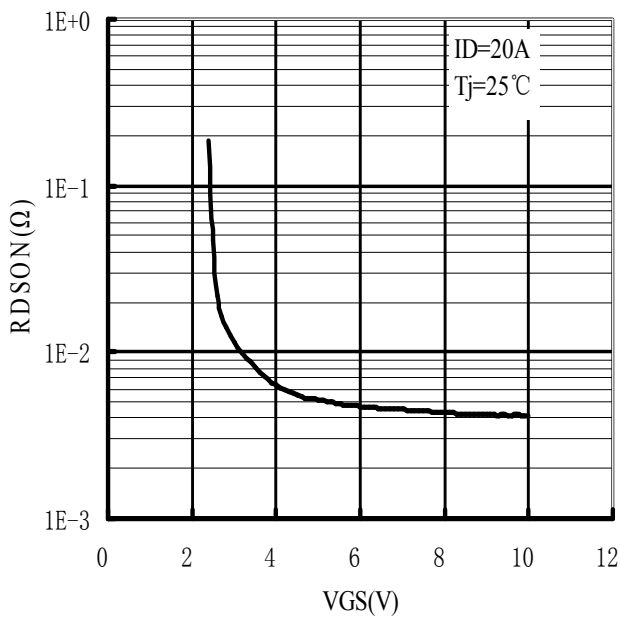
**Figure 5. Rdson vs. Drain Current Characteristics**



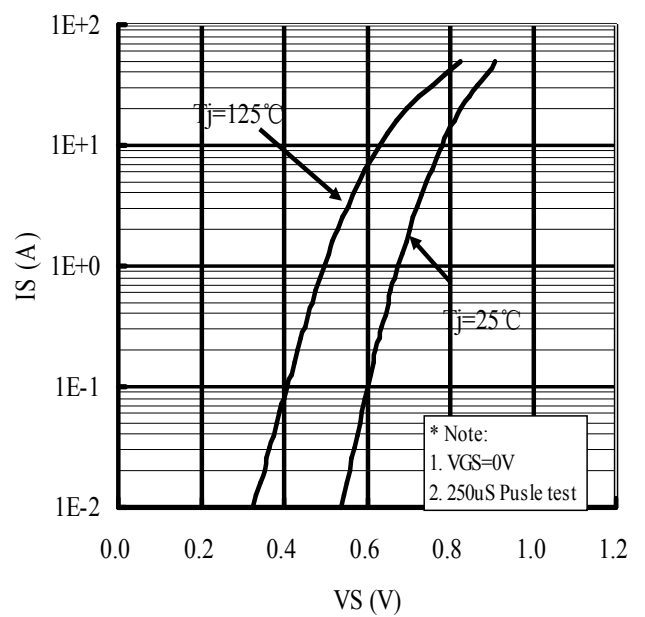
**Figure 6. Rdson vs. Junction Tem Characteristics**



**Figure 7. Rdson vs. VGS Characteristics**



**Figure 8. IS vs. VSD Characteristics**



## Typical Electrical and Thermal Characteristics

Figure 9. Gate Charge Characteristics

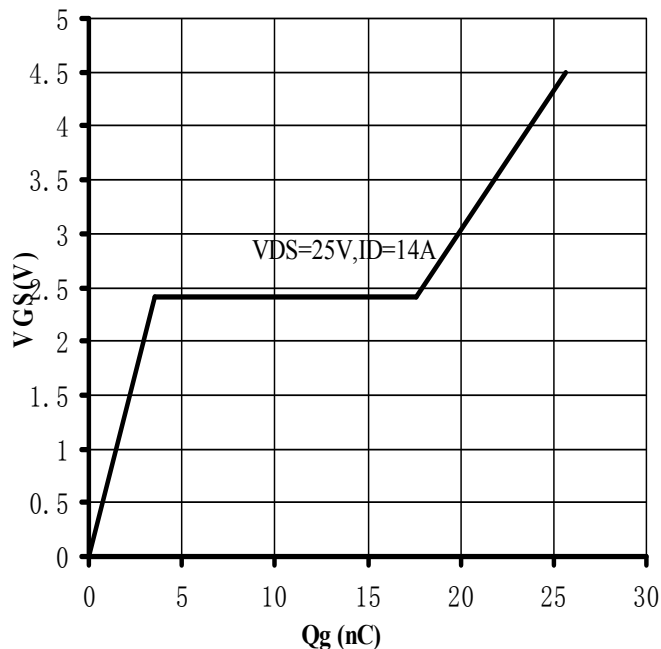


Figure 10. Capacitance Characteristics

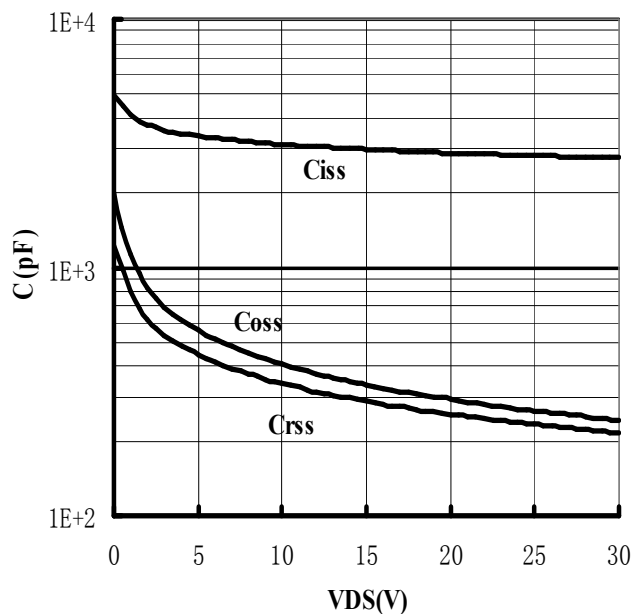
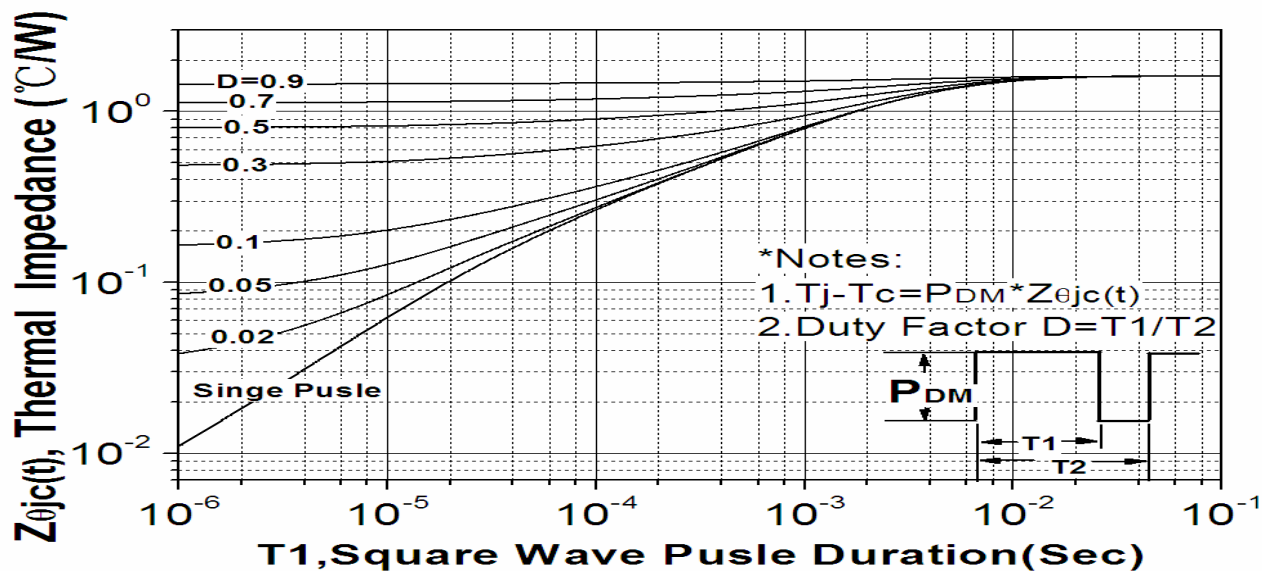


Figure 11. Thermal Resistance Characteristics





## Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel:5Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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